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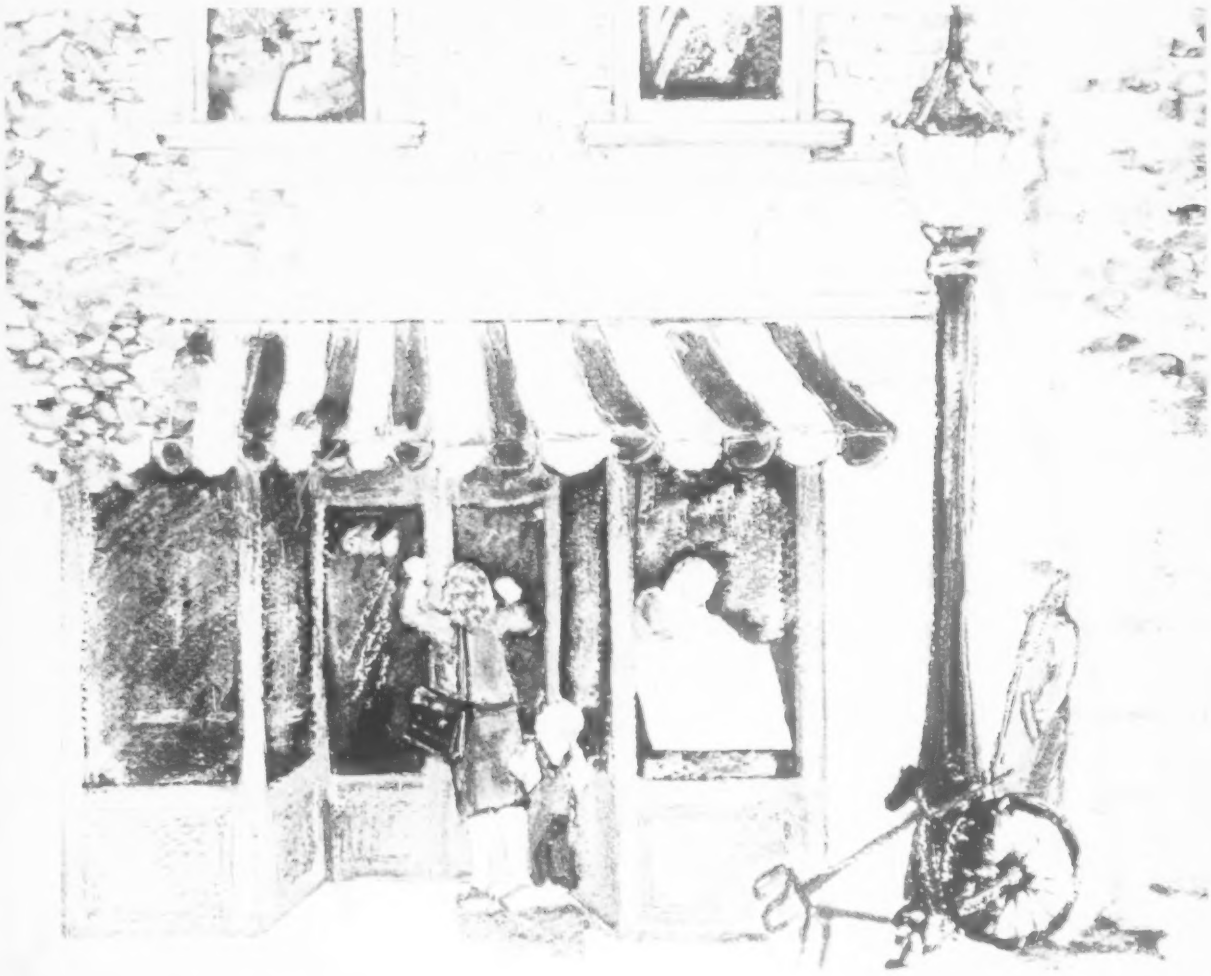

ARE YOU TRULY MARKET DRIVEN? Or will your customers find shuttered offices when they need after-hours service?

U.S., JAPAN SETTLE TRADE DISPUTE
Japan opens markets for cellular products

BELL ATLANTIC WINS AUDIOTEX BATTLE
RHCs can deny billing services to IXCs who don't block calls

MONDAY, JULY 3, 1989 Volume 217, No. 1

Telephony

INTEGRATING VOICE & DATA COMMUNICATIONS

The mom-and-pop LEC shops have built a reputation on customer service. But are they still accommodating their customers' changing lifestyles, or are they closing shop before the commuter crowd even gets home? Cover art by Laura M. Doyle

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Are you *truly* market-driven?

Your customers' lifestyles are changing, but are telephone company business practices keeping pace?

D. MICHAEL MAXWELL

JOSEPH STEELE

What is the industry's most important asset and how well is it managed? Suppose for a moment you are the chief operating officer of a telephone operating company.

With that in mind, look over the following list of assets you manage:

Central Offices	100
Buildings	125
Employees	1500
Vehicles	700
Access Lines	250,000
Network Transport (cable and electronics)	1000s of miles

Which of the above assets is most important to your success? Look back over the list and pick one before you read on.

We have asked this question of literally hundreds of people in our Centrex sales and marketing classes nationwide and have found that from presidents to service representatives the answer is almost unanimous—employees.

Employees are important—this is universally accepted. But to say that employees are your most important asset may indicate an inward focus and that is dead wrong.

Access lines are your most important asset. That is where it all starts. Without access lines you do not need the other assets listed. Access lines are customers.

What's In a Name?

Perhaps the reason more people do not get the right answer to the quiz above is because the industry has given customers new names like access lines or end users. Rather impersonal, isn't it? Why not say customer access lines or just plain customers? But the issue runs much deeper than what you call people who buy your services. It is rooted in whether you are market-driven or a market driver.

Many telephone executives state emphatically that they have a market-driven company. Market-driven means one thing—customer-driven. It means listening to your customers and noting changes in their habits and lifestyles. Based on these observations, you change your methods and practices to meet their needs, not your needs. The competitor who listens best, changes quickest to address customer input, and is a pleasure to deal with, wins. You may well say you don't have any competitors, but the local fiber and cable television carriers would heartily disagree.

In previous decades, people were generally at home during the day. If access was needed for an installation or if there was a question on the bill, a call to the office to check out the bill or make arrangements for a new extension was not an inconvenience during normal 8 a.m. to 5 p.m. working hours. In the '60s and even in the '70s, it wasn't a major problem.

Throughout the '80s, the industry has been in great internal turmoil and, therefore, internally focused, while the world around it has changed. Telcos are no longer directly responsible for the customer's inside wire and phones. Telcos take service to the house; customers take it from there. But many customers still want the telephone company to manage the entire job.

Problems arise, however, because customers often are not home during the day anymore. In fact, the daytime empty home is a growing phenomenon. The term "latchkey children" has been coined to talk about the empty homes to which nearly 7 million children return each day. We reviewed the Social Sciences Index back through 1965. The term "latchkey children" didn't show up in the publication until 1985. A statement from a 1987 article in American Demographic magazine says, "from 1980-1985, for example, the proportion of working women with children under age one increased from 39% to 49%. In 1984, 61% of all mothers of children under 18 worked, most full time."

Have telcos changed? The empty home situation exists, and the appointment system has addressed it for years. But if it were not for central office reconnects, deregulation and the requirement that customers handle their own wiring, telcos would be in a mess.

Still, there are millions of people who don't want the hassle of maintaining their own systems. They want telcos to handle the whole job: installation, wiring, maintenance—the works. Observe the inside wire maintenance sales efforts so popular since deregulation. They are a runaway success.

Customers want hassle-free service that works. So, if millions of your customers' homes are now empty during the day, you know their lifestyles have changed. The question really is whether the local telcos' methods and practices have changed to reflect the changes in their customers' lifestyles and expectations. This is market-driven thinking.

Track Record

Local exchange carriers have long measured their service success by what percent of service order due dates were met. This has been a central focus as to how well the company was performing for its customers. Many companies strive to make sure orders are filled within three days, 90% of the time.

But today you should ask, "At what cost?" How many of your customers have had to take time off work and sit around the house for several hours to meet the operating measurement needs of their telephone company? Maybe your service personnel wonder why those customers are so irate when telco representatives don't get there on time. Why don't they understand that your people had problems and just couldn't make it?

The question LECs must ask today is: Who pays those customers while they wait for a telco representative to arrive? The answer is disgruntled employers who are also your customers. You all personally know customers and employers who have complained about this practice.

Are members of single-parent households or two working-adult households supposed to check out billing problems on their employer's time? This seems like a double standard. This industry sells call accounting systems or services to businesses, and one benefit touted is that these systems let employers

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Services marketing

Services marketing involves a unique set of marketing challenges that must be understood and resolved if a new service offering is to be launched successfully or an existing offering is to be retained by its buyers. Everything in services marketing is viewed with a focus on the *customer*.

The customer is paying for something intangible. The customer buys what the service will do, not what it is. To be successful, the service company must periodically remind its customers what the service will do for them. The service company must continuously add value to the basic service capabilities it offers.

The customer never owns anything. There is no touch, feel or "designer look" to the purchase. Satisfaction must come from the solution to problems the service provides for the buyer, not the ownership or control of it, nor the pride of showing it off to others.

The customer never stops paying; the benefits of the service must be resold over and over and over again.

Otherwise, the customer will stop paying. A product purchase, by comparison, usually requires a one-time payment. With a service purchase, the customer buys into a relationship; the length of the relationship will depend on how successful the service company is in continuing to meet the needs of the customer and how well the customer is served every time the service company is contacted—for any reason. The company is only as good, in its customers' eyes, as the last contact with it.

Maintaining a solid relationship requires a strong retention marketing program.

Successful advertising and promotional programs personalize the service and company to the customer. They position the service and company as a partner with the customer for the long haul. They make the service's applications and benefits to the customer precise, understandable and non-threatening. And they have an effect on the company's own customer-contact employees, reinforcing their pride in the service and their desire to help the customer.

Successful administrative programs work best if customer-contact employees are managed by the marketing organization. Close attention must be paid to the motivation and commitment of customer-contact employees. The quality of service provided to customers by administrative, operations and sales employees must be tracked via report analysis and direct observation.

Market-driven

continued

track employees' non-productive time. And yet, if your customers want to talk to you, they have no choice but to call you during your office hours on someone else's nickel.

Telcos don't hesitate to have a telemarketing center call customers between 6 p.m. and 9 p.m. weekdays and 9 a.m. to 2 p.m. on Saturdays to sell new network services.

They know that is when the customer is home. So, why haven't they changed their operations to respond to customers' changing delivery needs during those same hours?

What can you do? Some companies are attempting to react to their customers' changed lifestyles. Most are not. Other service-marketing industries are changing their methods to become more responsive to their customers' changing lifestyles and expectations. Take the banking industry, for example. Vast change is taking place. Banks now offer later hours, Saturday and Sunday hours and responsive services.

Perhaps the local exchange industry should establish extended business office hours, provide flexible installation scheduling, and actively promote these changes in response to its customers' changing needs.

Call your business office and ask the following three questions your customers might ask: What are your business office hours if I have a question on my bill or if I want to order a new service or change a

continued on page 30

TABLE 1 SURVEY RESULTS

Question:
What are your business office hours if I have a question on my bill or if I want to order a new service or change a jack location?

Residential and business* customers

Business office hours	No. of companies	%
7:30 a.m.-7 p.m. Monday-Thursday 7:30 a.m.-5 p.m. Friday 8:30 a.m.-12 p.m. Saturday	1	5
8 a.m.-5 p.m. Monday-Friday	4	20
8 a.m.-5:30 p.m. Monday-Friday 8 a.m.-4 p.m. Saturday	1	5
8 a.m.-6 p.m. Monday-Friday	1	5
8:30 a.m.-4:30 p.m. Monday-Friday	2	10
8:30 a.m.-5 p.m. Monday-Friday	7	35
8:30 a.m.-6 p.m. Monday-Friday	1	5
9 a.m.-5 p.m. Monday-Friday	2	10
9 a.m.-6 p.m. Monday-Friday	1	5

*Business was the same except in every case, the day stopped at 5:00 p.m. One company offered extended hours through the company store.

TABLE 2 SURVEY RESULTS

Question:
If I use you to install my jacks and wire, what time of day can I get that done?

Residential and business customers

Installation hours	No. of companies	%
8 a.m.-5 p.m. Monday-Friday	13	65
8:30 a.m.-5 p.m. Monday-Friday	3	15
8 a.m.-12 p.m. and 1 p.m.-5 p.m. Monday-Friday	1	5
8:30 a.m.-4 p.m. Monday-Friday	1	5
8 a.m.-5 p.m. Monday-Friday and some limited 8 a.m.-12 p.m. Saturday	1	5
8 a.m.-3:30 p.m.	1	5

One company said the customer can be called ½ hr. before appointment.

One company said the customer can find out time of appointment on the day of service.

jack location? If I use you to install my jacks and wire, what time of day can I get that done?

If I don't want to take time off work or in case of business installation don't want my business disrupted, what kind of arrangements can I make to have you wire my jacks after 6 p.m.?

Next, see if what you find matches your company's slogan. Promotional slogans that tell how concerned you are about customers and how hard you are working to serve them better are empty promises unless you back them up with actions.

We conducted a limited random national sample of 20 telephone company customer service offices to test our observations. These offices included major metropolitan areas, smaller cities and Independent telephone company operating areas. Only 10% of the companies offered Saturday business hours (Table 1). One of those companies also offered extended weekday business office hours– 7:30 a.m. to 7 p.m., Monday through Thursday. Most companies continue to reflect an 8 a.m. to 5 p.m. operating mentality (Table 2). Fortunately, so do the CATV companies, which are future arch competitors. Table 3 is the most telling because it summarizes the stated employee attitudes toward customers.

TABLE 3 SURVEY RESULTS

Question:
If I don't want to take time off work, what kind of arrangements can I make to have you wire my jacks after 6:00 p.m.?

Residential and business customers

Categories	No. of companies	%
No arrangements	8	40
Some arrangements—extra charge	5	25
Limited arrangements—Saturday*	4	20
Evenings—extra charge	2	10
Special exception—very expensive	1	5

*Emergencies take precedence

Service representative comments:

'. . .hire an outside installer for work outside normal hours.'

'. . .you can request morning or afternoon installation times on Saturday.'

'. . .we will sometimes schedule Saturday installations, but we can't guarantee because emergencies take precedence.'

'. . .we would need to get special approval for off-hours installation, and it would take two weeks to arrange plus an extra charge.'

'. . .it will cost at least $150 to schedule outside of normal hours, and it's a special exception.'

'. . .It's a real common problem to get off-hours scheduling. Many people are choosing to do their own work.'

'. . .no way for residential. We offer limited Saturday scheduling for business, but nothing in the evening.'

'. . .need to make arrangements one week in advance and pay an overtime rate.'

'. . .have someone wait at the house for you.'

'. . .there is a possibility of special arrangements for business installation. Need to check with a supervisor, and it would cost around $200-$300 extra.'

Check Your Attitude

Telcos must have an attitude about their service business that reflects the customer as supreme. You might call it "other" focused rather than "self" focused. Telcos must fully understand what services marketing is. Only then can telcos use a planning approach to customer-related operating issues and their promotional support programs that keep the customer planted firmly on center stage.

We view services marketing as a key strategic concept in the post-divestiture industry. We have written a set of services-marketing planning statements to help us focus on these important issues as we think about our clients' programs from their customer's point of view (see sidebar page 26). Dozens of new services are being launched in markets all over the country. To be successful, they must be implemented with a services-marketing approach.

One company, Illinois Bell, is responding to its customers' changing lifestyles and expectations, offering business hours from 7:30 a.m. to 7 p.m., Monday through Thursday. Recognizing that most people are either not at home or are ready to relax on Friday evening, their business office hours on that day are from 7:30 a.m. to 5 p.m.

Saturday is the day many people like to handle details such as bill paying. Acknowledging this fact, Illinois Bell has established Saturday hours from 8:30 a.m. to noon. It has also established overtime rates for after-hour work at a customer's home.

This is a good start. Why not try evening installations? Most companies that charge overtime also make the stipulation that the customers must give the company a week or two notice so the "supervisor" can set it up. Why not freely offer convenience installation service? Offer it up-front to every customer with perhaps a 10% premium charge to cover your labor differentials. The telephone company would keep customers who want hassle-free, single-source service that works rather than force them to do their own wiring.

Your Most Important Question

Do you treat your customers as your most important asset and manage them in a market-driven manner? Other companies with broadband capacity pass more than 65% of your current customers and are licking their chops. Some offer broadband T-1 capacity today.

Only a customer-focused and responsive management team will remain the premier information transport provider to the current LEC customer base. T

D. Michael Maxwell and Joseph Steele are managing partners in Wink Communications, Chicago.

Which way do we go?

The industry is divided on which of the many options to pursue to upgrade analog switches

PAUL TRAVIS, Executive News Editor

As we move into the digital age, one of the biggest challenges facing telephone companies, especially Bell operating companies, is how to provide digital capabilities and enhanced services and features off the installed base of analog switches.

It is a particularly serious challenge for the BOCs, who have approximately 50 million lines terminating on more than 1700 analog 1AESS switches. It is less of a problem for Independent telcos because they have moved their networks into the digital age more quickly, having leapfrogged the electronic analog stored program control switch when they changed out their electromechanical switches for digital ones.

In recent years, the demands placed on the BOCs to provide new features and services have grown. The demands have come from users, regulators, interexchange carriers, judges and the telcos' own desire to modernize their networks and develop new revenue sources. The features and services include equal access for IXCs, high-speed data capabilities, signaling system 7, the integrated services digital network, videotex gateways and many others.

But many of these cannot be offered on existing analog switches by themselves, which places the BOCs in a difficult position. They have billions and billions of dollars invested in the dependable and feature-rich 1A electronic analog switches, which work just fine and are not yet fully depreciated. And regulators won't allow wholesale replacement with digital switches, fearing massive rate hikes.

Yet, the drumbeat for digital continues, and it is expected to grow as long as the 1As remain in the network—from five to 20 years. So, to compete, the BOCs must develop a strategy to provide the enhanced functions and capabilities. Fortunately, there are many options. Unfortunately, there isn't a consensus on the best one.

Options, Options, Options

One option for the BOCs is to upgrade by installing relatively inexpensive adjunct equipment offered by several niche vendors such as Integrated Network Corp., Network Access Corp. and SRX, which are eagerly pursuing what they see as a great growth market. How large that market will be still remains unclear.

. . . the BOCs must develop a strategy to provide the enhanced functions and capabilities. Fortunately, there are many options. Unfortunately, there isn't a consensus . . . .

INC offers a product line that can provide switched 19.2 kb/s, 56 kb/s or 64 kb/s transmission on existing analog lines via digital line cards.

"A telephone company can order a line interface shelf at a cost of about $10,000 to $15,000 to equip an office, and the present software on the 1A can be used to create a virtual data switch. Then it is done on a per-line or per-trunk basis," explains Craig Bender, INC vice president of marketing. INC, which recently got $23 million in additional financing, has sold its products to Nynex, Bell Atlantic and U S West. Bender said the product is compatible with ISDN and can be upgraded to clear channel 64 kb/s once those capabilities become available.

NAC has sold more than 2 million lines of its System Contac product, which provides equal access for IXCs on a wide range of BOC central office switches. NAC's newest product, System Contac Base, allows the 1A to offer a wide range of enhanced services, including SS7, CLASS, ISDN, digital Centrex, virtual private networking and CO-local area network connectivity. Its SS7 application recently passed Bellcore Phase 1 conformance testing and will be tested this fall by Pacific Bell in San Diego.

NAC President Raju Patel describes his approach as an "applications platform. The technology is such that there isn't anything current digital switches offer today that we can't develop. In fact, we are making features available faster by augmenting the 1A."

SRX, under a multiyear agreement with Nynex, is developing an adjunct network controller that will provide enhanced digital Centrex services over any switch. Options are expected to include 64-kb/s data transmission, 2B+D capability, automatic moves, increased call coverage and routing, station message detail recording, advanced attendant services and single-button programming.

Other options, depending on what is needed, could include CO-LAN products offered by David Systems, AT&T and others, digital cross-connects offered by scores of suppliers, and software upgrades providing SS7 interfaces and other features.

The most common approach taken by the BOCs when digital capabilities and enhanced services are needed is to cap the growth of the 1A and co-locate a digital switch in the same office, in effect overlaying a digital network on top of the analog. As new customers are added and old customers churn off the analog switch, the co-located digital switch grows into a free-standing digital switch and replaces the 1A.

The major digital switch sup-

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pliers are AT&T and Northern Telecom, who control about 80% of the CO market. NEC America is trying to serve that market with its NEAX 61E, and Ericsson has sold some AXE-10s for that role.

Questions, Questions, Questions

The BOCs appear to be faced with a simple question of whether to replace, co-locate or upgrade. Considering the stretched-out 1A replacement schedule, upgrading would appear to be the most economical. But nothing is simple in telecommunications these days.

"It all depends on customer demand, and we are still in the process of determining where that demand might come from. That is what we need to determine the strategy for the 1A," explains Ed Angle, director of network architecture planning for Pacific Bell. Pacific Bell is promoting a network approach called Netsys, which involves a layered architecture using standard interfaces. While planning to provide digital capabilities where needed, the company will not replace more than a couple of its 1As each year until Netsys nodes are available, probably in the mid- to late 1990s.

"When it comes to providing digital Centrex, the question is whether to replace or upgrade. We have a dialogue within the company regarding this type of thing," says Angle. "On one hand, adding things to the 1A slows down the impetus to move to a new environment. On the other hand, we would like to do it that way because it is economical. In California, because of regulation, it is really critical that whatever we do is based on economics and the commission has to agree.

"I think our choice would be to do nothing with the 1A and move to Netsys as fast as it becomes available. We would prefer not to upgrade an analog switch. The vendors haven't shown anything that provides full digital functionality yet. But we are talking to vendors. We wouldn't want to miss an opportunity."

Pacific Bell has installed several NAC adjuncts to provide equal access and will test NAC's new product. "If those tests turn out to be successful, that could change our thinking," Angle says.

Several BOCs already have moved aggressively to provide digital services, with Southern Bell reporting that 44% of its lines are digital. Sister company South Central Bell is 35% digital. As for the Bell regional holding companies, Nynex is 38% digital, Bell Atlantic 34%, Ameritech 30%, U S West 30%, Pacific Bell 28% and Southwestern Bell 25%.

Southwestern Bell wants to move quickly to modernize its networks and has proposed replacement programs in several of the states it serves. In Missouri, the company plans to spend $180 million to put digital switches in 112 communities by 1990. In Kansas, the company says it will spend $160 million to replace 131 analog switches with digital switches.

Those modernization programs, however, are tied to an effort to reduce state regulation and win greater flexibility in pricing local services. The Missouri Public Service Commission recently rejected Southwestern Bell's proposal and ordered the company to cut rates by more than $100 million annually. Although the state commission said the telco has enough money to go ahead with the modernization program, company officials said the rate cut seriously jeopardizes the entire program.

That action underscores the role state regulators can play in network modernization. In California, regulators are reviewing Pacific Bell's spending practices to see whether the company properly spent funds to upgrade the network. Regulators have the power to slow modernization programs or even disallow recovery of money already spent.

Nonetheless, Phillip Goelz, manager of architecture planning for Ameritech Services, said his company has usually chosen to replace or co-locate, rather than upgrade with adjuncts.

"We've arrived at the conclusion that it's not worth the dollars for the short-term gain [from upgrading with an adjunct]," he says. "You have to ask yourself just what is the marginal utility that an adjunct will provide. Sure, an adjunct affords you the opportunity to install something that gives you a little bit of digital capability without replacing the 1A. But how many are going to put in something that has a limited life?"

Goelz argues that most of the new services demanded by users are really data services, not digital services. "And there are lots of ways to provide data services, such as regular dial-up, private line access to packet switching,

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SWITCHING TECHNOLOGIES—PERCENTAGE OF TOTAL ACCESS LINES

Year	EM	Analog SPC	Digital SPC	Total SPC	Total
1980	58.88	41.09	0.03	41	100
1981	52.86	46.96	0.17	47	100
1982	48.27	51.39	0.35	52	100
1983	42.74	56.35	0.91	57	100
1984	38.20	58.47	3.34	62	100
1985	30.84	59.54	9.62	69	100
1986	23.36	59.98*	16.67	77	100
1987	16.76	58.12	25.11	83	100
1988	10.39	56.48	33.12	90	100
1989	6.55	53.73	39.73	93	100
1990	4.65	50.57	44.78	95	100
1991	2.10	44.35	53.55	98	100
1992	1.14	36.49	62.37	99	100
1993	0.61	27.57	71.82	99	100
1994		19.07	80.61	100	100
1995		12.19	87.77	100	100
1996		7.35	92.61	100	100
1997		4.26	95.70	100	100
1998		2.41	97.55	100	100
1999		1.35	98.61	100	100
2000		0.74	99.22	100	100

EM—Electromechanical
SPC—Stored program control
* Peak percentage for analog SPC

Source: Technology Futures Inc.

Which Way *continued*

data-over-voice technology and CO LANs. Now, if ISDN were something that people were banging on the doors for, it might be different. The truth is we carry a lot of data and do it quite well."

Adding an Adjunct

Analysts generally agree that the BOCs, when faced with a demand for advanced capabilities, will co-locate a digital switch or replace the 1A entirely. However, they also say there is a short-term market for adjunct equipment to upgrade the 1As.

"It's a logical market for the Bell companies to look at, especially as a low-cost way to provide some kind of digital capability for an analog CO. There is a potential market out there for upgrades. Companies like INC and others don't have to sell millions and millions of lines to do well," says William Rich, an analyst with Northern Business Information/Datapro.

Rich thinks the 1A replacement market won't take off until 1995-96 as the BOCs wait to see what the next generation switch looks like and wait for the demand for ISDN to develop. "If a telco needs digital off of a 1A, it has the ability to do that. I'm not sure there is any incentive to yank those out. The telephone companies we talk to tend to cap the existing analog switch and co-locate a digital switch, or they use a remote working off a host."

Although products to upgrade the 1A "have a limited lifecycle, these companies are filling a niche in the market today. They will do well in the short term, the next five to seven years," says Rich. "But the telephone companies are not sure of the best way to solve some of these problems, whether to use line cards or adjuncts."

Lawrence K. Vanston, a senior associate at Technology Futures Inc., recently produced a forecast for the major telcos that said analog switches will account for less than 20% of access lines by 1994 and less than 1% by the year 2000 (see chart on page 36).

"What a lot of these add-on products do is buy some time," Vanston says. "It allows you to postpone a major capital invest-

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Which Way *continued*

ment. But I think there will be a real market for only about five years. I wouldn't want to build a company on that."

Co-location is the strategy Vanston sees the telcos using, and he believes they will quickly shift lines to the digital switch as the "cost of maintaining two technologies gets expensive. The cost of maintenance and buying new software generics will tip the scale."

Jerry Stern, vice president at the Eastern Management Group, also sees the BOCs using co-location and says it has one key advantage: "As long as there is one subscriber on the old switch, it remains in service and can be depreciated in the normal way. That allows telephone companies to provide digital services without directly replacing the 1A and allows them to avoid a big rate hit."

In contrast to many other analysts, Stern believes 1As will remain in service "10 to 20 years into the next century. There is not any chance in the world they will be all gone by the year 2000. I'm not sure there is any compelling reason to replace them. I think the capping and parallel migration strategy will be adequate."

Stern notes that none of the domestic adjunct companies is attempting to become a CO switch vendor. "That market is dominated by AT&T and Northern Telecom. They think that with Open Network Architecture, SS7 and ISDN they can add services on an adjunct basis more quickly than the big switch vendors. They may be right. It provides a degree of freedom in an area where the Bell companies need freedom and it also takes pressure off the big switch vendors.

"The market is screaming for new features on the big switches, but it takes a long time to develop a new software generic. If you can just have a box that sits out beside the switch and offers new services, it makes a whole lot of sense."

Another point the analysts agree on is that the future direction of the network is still cloudy and uncertain.

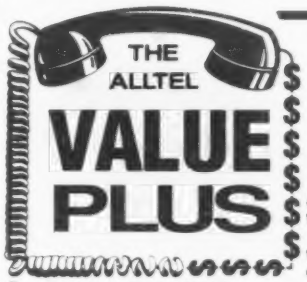
"Nobody really knows how it's going to wind up. And you have telephone companies spending billions without knowing," says Stern.

"The market is still in its formative states," says NBI's Rich. "The telephone companies are not as eager as they were at first to do major replacements. They have taken a step back and are waiting to see what the future brings."

TFI's Vanston agrees: "Telephone company decision-makers are coming out on both sides of this issue. They are really scratching their heads on this one. And its hard to predict a market that is influenced so much by a small number of decision-makers." ■

Further reading

Pac Bell's Bandler Explains Netsys
Interview with Michael Bandler
Jan. 30, 1989, page 32
CO Vendors in Pursuit of Intelligence
by Michael Warr
April 17, 1989, page 34
The Old 1A— It's Not Dead Yet!
by William Church
May 22, 1989, page 72



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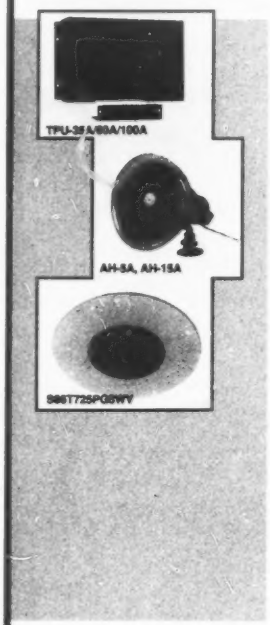

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